

Kentucky Division of Water
200 Fair Oaks Lane, 4th Floor
Frankfort, KY 40601
Phone: 502-564-3410
Website: <http://water.ky.gov/waterquality/Pages/TMDLHealthReports.aspx>

Bacon Creek Watershed

Health Report

Department for Environmental Protection - Division of Water

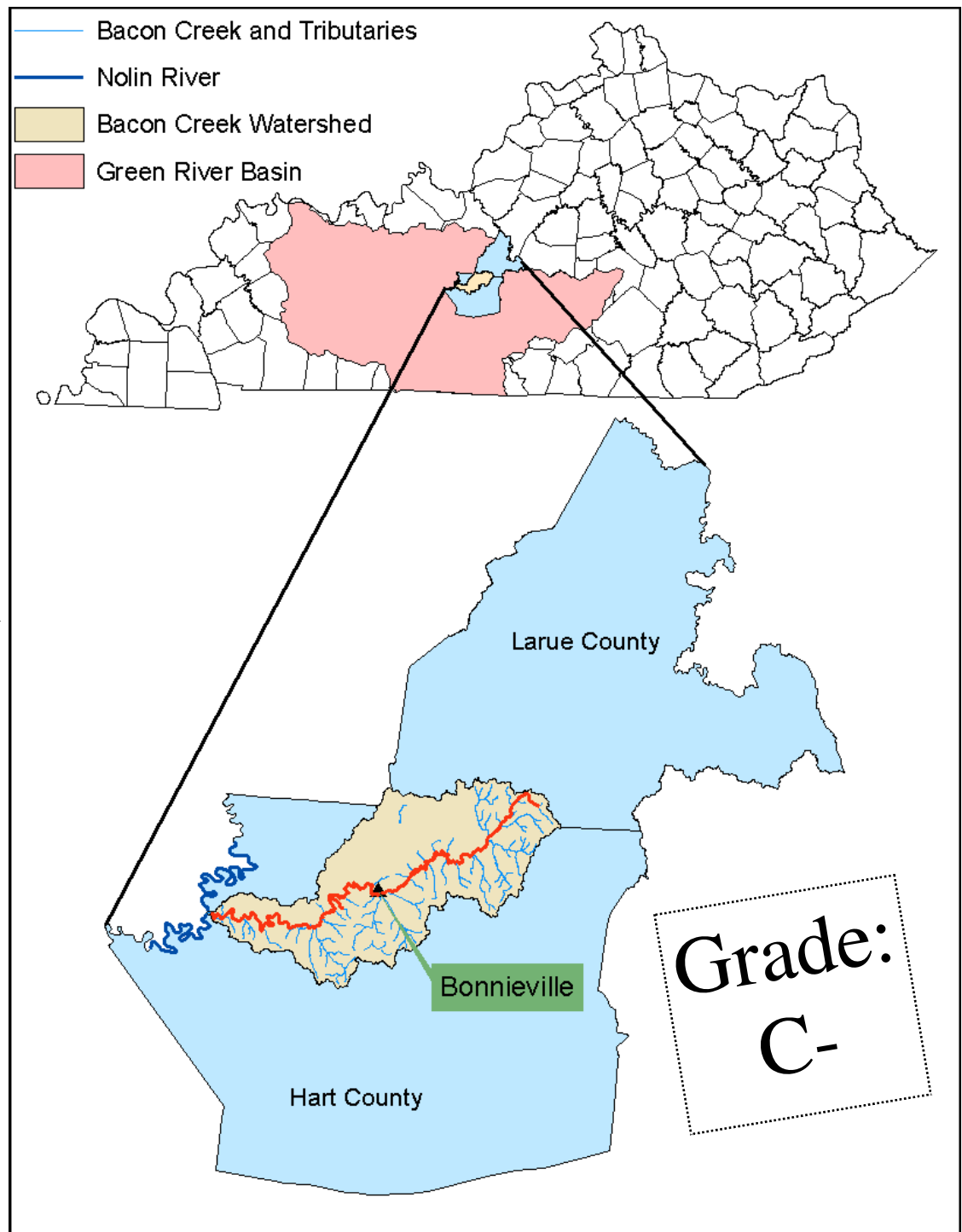
The Kentucky Division of Water (DOW) is the state agency responsible for carrying out the requirements of the Clean Water Act to reach the goal of making all waters in Kentucky safe for swimming and fishing (called **uses**).

DOW has developed this health report to inform the residents of Larue and Hart counties of efforts to examine the health of Bacon Creek and the area of land that drains into Bacon Creek, which is called a **watershed**.

Upon initial evaluation, it was determined that Bacon Creek (shown in **red** on the map) does not support the swimming use required by the Clean Water Act due to high levels of *E. coli*.

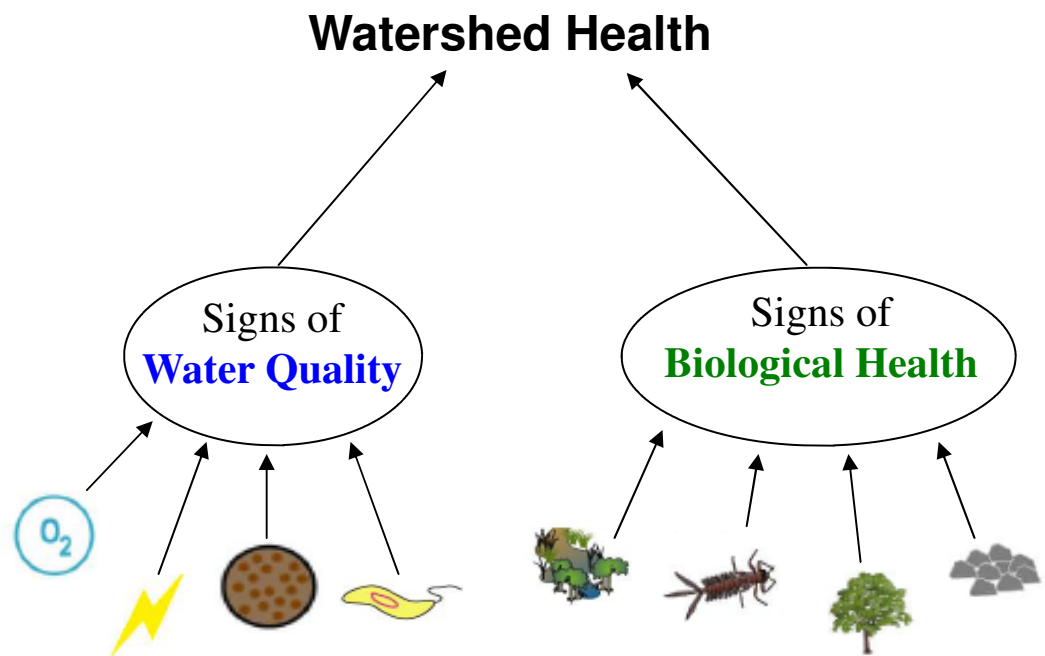
The U.S. Environmental Protection Agency (EPA) requires that states conduct watershed studies on all such waters to calculate the maximum amount of pollution a creek can receive and still support a healthy watershed. This amount is known as a **Total Maximum Daily Load**, or TMDL.

Following a year-long study by DOW biologists to gather scientific data, the division has given a “report card grade” of a **C-** to the watershed. This health report explains the signs of health that went into assigning that grade and provides information on how the grade can be improved.



Grading System

1. Data collected were divided into signs of **water quality** or signs of **biological health**.
2. Each sign received a grade, A through F, according to the results of our study, which were compared to health and science requirements and DOW scientific information.
3. The grades from each biological health sign were averaged to achieve a biological health score.
4. Similarly, each sign of water quality was averaged to achieve a water quality score.
5. These two scores were averaged to achieve a **watershed health grade**.



The grades can also be used to compare **sites** or **signs**. For example, one site within a watershed may receive a higher grade than the other sites in that watershed, demonstrating its quality. Or, one sign may receive a higher grade than the other signs, demonstrating that aspect of watershed health is doing better than others.

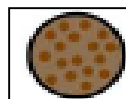
Signs of Water Quality



Dissolved Oxygen: Concentration of oxygen dissolved in water and readily available to fish and other aquatic organisms.



Specific Conductivity: A measure of the ability of water to conduct an electrical current, which is used for approximating the total dissolved solids content of water. Low specific conductivity is desired, and increasing specific conductivity negatively impacts fish and aquatic bugs.



Turbidity: A measure of how "cloudy" the water is due to suspended sediment or organic matter.



E. Coli: A type of bacteria that lives in the intestinal tract of man and other warm-blooded animals. For a site to receive an F, the *E. coli* concentration was above the level considered safe for swimming 80 to 100 percent of the time.

Signs of Biological Health



Aquatic Macroinvertebrates (bugs): An animal without a backbone, large enough to be seen with the naked eye. They are often the immature forms of insects that live on land as adults and are an important food source for fish. Different species prefer different habitats, and some are more tolerant of pollution than others.



Total Habitat: Stream habitat is assessed by scoring 10 habitat signs, which are both living and nonliving parts of the surroundings that support an organism, population or community.











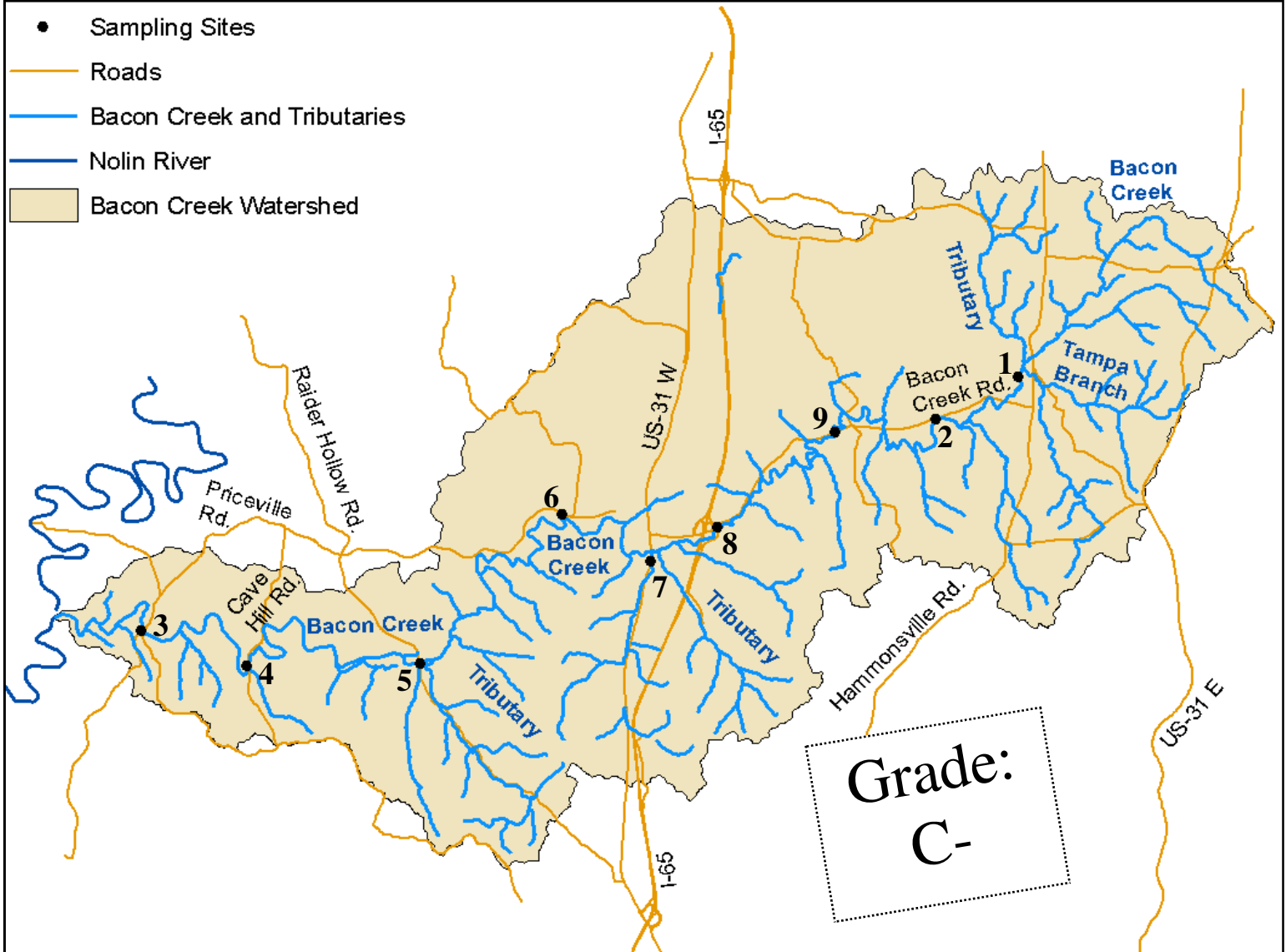
Riparian Zone: Land adjacent to a stream that has distinct soil types and plant communities, which aid in absorbing water and shading the stream. To receive an A, the riparian zone must be at least 18 yards wide on each side of the stream.



Available Cover: The quantity and variety of structures in the creek that provide a place for aquatic organisms to hide, feed, reproduce and raise young. Examples include cobble and boulders, fallen trees, logs, branches, root mats, undercut banks and aquatic vegetation.

Grades by Sampling Site & Sign

Site #	Creek Name									Site Grade
1	Bacon Creek					B	F	C	C	C
2	Bacon Creek						F	D	D	D-
3	Bacon Creek	C	C	C-	C		B	A	B	B-
4	Bacon Creek	C	C	D	B		C	B	B	C+
5	Bacon Creek	B-	C	D+	C		F	F	D	D
6	Bacon Creek	B	C	D	D		F	B	B	C
7	Tributary to Bacon Creek	B	D+	C-	F		F	D	B	D+
8	Bacon Creek	B	C	C-	C		F	D	C	C-
9	Bacon Creek	B-	C+	D	D		F	C	C	C-
Sign Grade		B-	C	D+	C-	B	D-	C	C	



Summary: Room for Improvement

POSITIVES



Dissolved oxygen (DO) levels were suitable for fish and bugs at most sites. Some lower DO grades may have resulted from high levels of turbidity, which shades aquatic plants and increases bacterial communities that consume oxygen.

NEGATIVES



Turbidity was often high, indicating that Bacon Creek's waterways tend to be "cloudy" from suspended sediment or organic matter. High turbidity can negatively affect how aquatic organisms breathe and feed, which can reduce their populations.



Total habitat was reduced throughout the Bacon Creek Watershed. Total habitat is the base of the building blocks for a healthy watershed, and when it is lacking, aspects of water quality and biological health begin to degrade.

GRAY AREA



E. coli concentrations exceeded the level considered safe for swimming 50% of the time, on average. These levels may cause gastrointestinal illness if the water is swallowed or an infection if contact is made with an open sore or wound.



Specific conductivity most often scored a C, indicating elevated levels of total dissolved solids. These levels can negatively affect bug communities, thereby reducing the amount of food available for fish.



The riparian zone width varied greatly throughout the Bacon Creek Watershed. When the riparian zone is wide (grade A), streams are well shaded, banks are more stable and runoff is filtered before entering the stream. As the riparian zone width decreases, these benefits are reduced.



Available cover is greatly reduced throughout the watershed. Not only is available cover an important place for fish and bugs to live, feed, hide from predators and mate, it also provides habitat for beneficial bacteria, an important food source for aquatic bugs.



Aquatic macroinvertebrates (bugs) were only collected at site 1 where they received a B. It is difficult to make a conclusion based on one collection, therefore the bug community status in the Bacon Creek Watershed is undetermined.

What can you do?

- **Trees are the best way to protect and restore water quality and biological health.**
 - ◊ Leave in place or establish vegetation along-side streams to provide natural filters that stabilize stream banks, minimize erosion, regulate water flow, provide shade, retain sediment and absorb excess nutrients.
 - ◊ Plant trees and do not mow within 18 yards of the stream bank.
- **To keep water safe for swimming**, keep animals out of the streams, which will limit the amount of animal waste entering the waterways, reduce stream bank erosion and protect habitat.
- **To improve habitat**, allow fallen trees, logs, leaves, gravel, cobble and boulders to remain in the stream to create habitat for fish and bugs to feed, find refuge and reproduce.
- **To reduce turbidity**, maintain streamside vegetation, plant cover crops, install settling ponds and properly guard waterways during construction activities.
 - ◊ **By reducing turbidity** toxins and metals, which bind to sediment, will also be reduced.
- Keep grass clippings, petroleum products, trash, and litter out of storm drains; this material enters the stream directly without treatment.
- Service your vehicle regularly to prevent oil and anti-freeze leaks and reduce noxious emissions.
- Become a certified citizen **volunteer** water quality monitor or establish a program in your local community or watershed.
- **Talk to your local legislators** about improving the health of your watershed. Stress the importance of **land management** as land is developed.

Where to go for more information

- **Making changes at home and work:** Bluegrass PRIDE at www.bgpride.org/gallery1.htm
- **Volunteering:** Watershed Watch in Kentucky at water.ky.gov/wsw/Pages/default.aspx or contact Jo Ann Palmer at 800-928-0045 or JoAnn.Palmer@ky.gov
- **Purchasing or planting native trees and plants**
 - ◊ Division of Forestry: forestry.ky.gov/Pages/default.aspx
 - ◊ Kentucky Native Plant Society: www.knps.org/plant_resources.html

Grants and Programs

- KY's Nonpoint Source (Runoff) Pollution program: water.ky.gov/nsp/Pages/default.aspx
- KY's Natural Resource Conservation Service: www.ky.nrcs.usda.gov/
- KY's 319 Grant program: water.ky.gov/Funding/Pages/NonpointSource.aspx or contact James Roe at 502-564-3410 or James.Roe@ky.gov
- Hinkston Creek Watershed Protection Project: <http://www.hinkstoncreek.org/index.html>